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BIOLOGICAL SPECTRUM OF THE VEGETATION OF RATLAM DISTRICT (M.P.)

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ABSTRACT

In the present paper, the life forms of the angiosperms of Ratlam district, belonging to 116 families 461 genera and 802 species have been studied. The same has been compared with Raunkiaer's normal spectrum and other spectra of similar climatic regions of India. Phaenerophytes, Therophytes, Chamaephytes, Geophytes, Lianas, Parasites and Epiphytes represent 14.5, 50.1, 12.1, 12.3, 10.3,0.37 &0.25 percentage of vegetation respectively. The dominance of therophytes indicate the phytoclimate of district as therophytic which is characteristic of semi-arid zones.

INTRODUCTION

Vegetation is the result of climatic, edaphic and biotic factors prevailing in a region. As a corollary, vegetation is also a good indicator of climate, soil and anthropogenic influences. Example can be cited of certain xeromorphic features and definite life forms dominating the xeric localities. Due to development of certain adaptations suited to the environmental conditions these species tend to become restricted to that area. In the long run they individualise these regions on a floristic basis.

A plant's life-form or growth form is among its most striking characteristics. Humboldt (1805) formulated the concept of life-form and Raunkiaer (1934) suggested an ecologically oriented classification system based on the belief that the flora of a given tract is an indicator of its climate, *i.e.* the life-forms best adapted to certain climate will form a higher percentage of flora in that climatic region. According to this system the plant climate of a region is characterised by the life-forms, which in the biological spectrum of the region, exceed the percentage of same life-forms in the normal spectrum. Raunkiaer's system has been widely used as such or with a few modifications (Braun-Blanquet, 1932 ; Dansereau, 1956 ; D. Muller-Dombois & H. Ellenberg, 1974).

STUDY AREA

Ratlam district is situated in the western-most part of Madhya Pradesh and lies approximately between latitudes 23°5′-23°55′N and longitudes 74°31′-75°40′E. It is set on Malwa plateau bounded by the Vindhyas in the south, the Panch Mahals in the south-west and Kauntel plateau in the north. The Malwa plateau is characterised by an overlay of Basalt rocks with the property of quick weathering, high erodibility and vertical cutting. The district is drained by the Chambal and Mahi rivers and their tributaries. Most of the district is overlain by black cotton soils.

Bhattacharjee *et al.* (1982) have included Ratlam district in two Bio-Climatic zones, (a) Semi-arid hot with moderate summer water surplus, in the area around Mahi catchment and (b) Semi-arid hot with little or no summer water surplus, for the remain-

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ing part of the district. The rainfall pattern is monsoonic with maximum rainfall from June to September. Thus the area is subjected to severe to acute drought conditions in winter and summer. The average annual precipitation is around 1165 mm though it varies from year to year. The mean annual temperature is 25.5°C.

OBSERVATION AND DISCUSSION

The present work is based on extensive floristic explorations of the district. The classification of plants into their life-forms has been done according to Raunkiaer's system as revised by Muller, Dombois and Ellenberg (1967 b).

Among the 802 species collected from the area, the analysis for different life-forms indicate 50.1 percent therophytes (Th), 12.1 percent chamaephytes (Ch), 14.5 percent phanerophytes, (Ph), 12.34 percent geophytes (G. including hydrophytes), 10.34 percent lianas (L), 0.37 percent parasites (P) and 0.25 percent epiphytes (E). Nanophanerophytes (N) and hemicryptophytes (Hc) are absent and hydrophytes (Hh) comprise a moderate part of 12.34 percent of geophytes. Thus we find that the therophytes are more abundant and have the highest percentage followed by phanerophytes in the district.

Comparison of the Biological spectrum of Ratlam district with other regions reveal a higher percentage of therophytes and relatively lower percentage of phanerophytes. This is because the annuals are best adapted to tide over the unfavourable period which they do in the form of seeds. The predominance of therophytes is indicative of a warm dry climate in conformity with Bioclimate diagram of Danserau (1952). It also indicates a pronounced biotic influence which maintains the vegetation open for further invasion of annuals.

Presence of relatively less percentage of phanerophytes is due to unfavourable climatic conditions like longer period of dry months, relatively less annual rainfall and therefore, less humidity.

The chamaephytes, which considerably reduce the transpiring surface during the dry period form an important group among the arid zone vegetation (Zohary, 1954). As the chamaephytes are indicators of cold zones, their presence comparatively in less number is quite justified.

The higher percentage of geophytes (which are inclusive of hydrophytes) as against the normal spectrum may be due to slightly more humid and warm conditions as com-

Table 1 : Biological spectrum of Ratlam District and some other similar climatic types in India

Region	No. of dry months	Percentage distribution of life-forms									
		Th	Ph	N	Ch	HC	HH	G	P	L	E
Normal Spectrum (Raunkiaer, 1934)	—	13	28	15	9	26	2	4	—	—	3
Semi-arid zone of Northern India (Meher-Homji, 1964).	9-10	33	11	12.3	18.3	10.4	3	5.2	1	6	—
Semi-arid zone of Southern India (Meher-Homji, 1964)	7	28	15	15.3	12.4	11	4	6	1	7	—
North-East Haryana (Jain & Singh 1984)	8-9	42.5	12.1	2.4	22.8	5.1	5.2	—	—	8.7	0.7
Ratlam District, M.P. (Chaturvedi, 1984)	8-9	50.1	14.5	—	12.1	—	—	14.34	0.31	10.34	0.25

pared to other regions and also due to loose, fertile upper soil horizon which favours the development of the perennating organs of geophytes. As compared to the normal spectrum, the hydrophytes are better represented. However, their occurrence in variable proportion depends on the abundance of puddles, ditches, ponds and riverbeds.

The epiphytes, (0.25%) and parasites (0.37%) are poorly represented as compared to normal spectrum. However, the lianas from around 10 percent of the vegetation.

Since the present spectrum shows the dominance of therophytes as compared to the normal spectrum the phyto-climate of the area may be considered therophytic, characteristic of semi-arid/arid regions.

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